

FORM PTO-1390
(REV. 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NO.
RAP04 P-582ATRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371U.S. APPLICATION NO. (If known,
see 37 CFR 1.55)
10/018268INTERNATIONAL APPLICATION NO.
PCT/EP00/04283INTERNATIONAL FILING DATE
May 10, 2000PRIORITY DATE CLAIMED
May 11, 1999TITLE OF INVENTION: **DOCK-TO-DOCK RECEIVING AND DISPENSING FOR POSTAL PROCESSING CENTER**

APPLICANT(S) FOR DO/EO/US

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2)):
 - a. ☒ is attached hereto (required only if not transmitted by the International Bureau).
 - b. ☐ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)):
 - a. ☐ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)):
 - a. ☒ are attached hereto (required only if not transmitted by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 20. below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
14. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information: Copy of International Preliminary Examination Report.

US APPLICATION NO. (if known, see 37 CFR 1.5) <div style="font-size: 1.5em; font-weight: bold; margin-top: 10px;">10/018268</div>		INTERNATIONAL APPLICATION NO. PCT/EP00/04283		ATTORNEY'S DOCKET NO. RAP04 P-582A	
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21. ■ The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492(a) (1) - (5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO..... \$1,040.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$ 890.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$ 740.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$ 710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(2)-(4) \$ 100.00 <div style="text-align: center;">ENTER APPROPRIATE BASIC FEE AMOUNT =</div>				CALCULATIONS PTO USE ONLY	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	24 - 20 =	4	x \$ 18.00	\$ 72.00	
Independent claims	5 - 3 =	2	x \$ 84.00	\$ 168.00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$280.00		
TOTAL OF ABOVE CALCULATIONS				=	\$1,130.00
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				+	\$
SUBTOTAL				=	\$1,130.00
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
TOTAL NATIONAL FEE				=	\$1,130.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				+	\$ 40.00
TOTAL FEES ENCLOSED				=	\$1,170.00
				Amount to be refunded:	\$
				charged:	\$

a. ■ Checks in the amounts of \$1,130.00 and \$40.00 to cover the above fees are enclosed.

b. ☐ Please charge my Deposit Account No. 22-0190 in the amount of \$_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

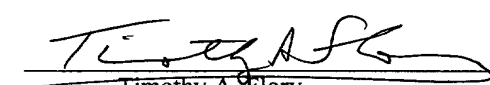
c. ■ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 22-0190. A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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PATENT
RAP04 P-582A
Express Mail No. EL686018325US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

International Application No. : PCT/EP00/04283
International Filing Date : May 10, 2000
Applicants : Gary P. Burns and Matthew R. Dubois
For : DOCK-TO-DOCK RECEIVING AND
DISPENSING FOR POSTAL PROCESSING CENTER

Box PCT
Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

PRELIMINARY AMENDMENT

Prior to examination, Applicants wish to amend their application as follows:

In the Claims:

Claims 1-16 were amended during the International Phase on May 14, 2001. Please replace claims 1-16 with the following rewritten claims:

1. (Amended) A postal processing facility including a sorting system that receives mail in trays and sorts mail to trays and a dock area including a plurality of transportation docks that provide interface with transportation vehicles, comprising:

a receiving and dispatching system having at least one receiving and dispatching assembly that loads trays of sorted mail from a sorting system to transportation fixtures and unloads trays of mail to be sorted from transportation fixtures to the sorting system; and

wherein said receiving and dispatching system is at the dock area of the postal processing facility thereby providing substantially direct movement of fixtures between transportation vehicles and said receiving and dispatching system.

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2. (Amended) The postal processing facility of claim 1 wherein said receiving and dispatching system includes at least one receiving and dispatching assembly that is adapted to both unload transportation fixtures and load transportation fixtures.

3. (Amended) The postal processing facility of claim 2 including a plurality of said receiving and dispatching assemblies, a sortation conveyor having a main line defined by a conveying surface and a plurality of spurs, extending from said main line to said receiving and dispatching assemblies.

4. (Amended) The postal processing facility of claim 3 wherein said spurs include separate spur lines for moving trays from said sortation conveyor to the receiving and dispatching assemblies and for moving trays from said receiving and dispatching assemblies to said sortation conveyor.

5. (Amended) The postal processing facility of claim 3 wherein said conveying surface is a continuous loop.

6. (Amended) The postal processing facility of claim 3 wherein said conveying surface is elevated with respect to said receiving and dispatching assemblies.

7. (Amended) The postal processing facility of claim 3 including individual enclosures around said receiving and dispatching assemblies with a moveable gate that can be selectively opened to allow other transportation fixtures in other receiving and dispatching assemblies to be loaded or unloaded while one transportation fixture is being removed.

8. (Amended) The postal processing facility of claim 1 wherein said transportation fixtures are wheeled carts.

9. (Amended) A postal processing facility including a sorting system that receives mail in trays and sorts mail to trays, comprising:

a receiving and dispatching system that loads trays of sorted mail from a sorting system to

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transportation fixtures and unloads trays of mail to be sorted from transportation fixtures to the sorting system; and

wherein said receiving and dispatching system includes at least one receiving and dispatching assembly that is adapted to both unload transportation fixtures and load transportation fixtures.

10. (Amended) In a postal processing facility including a sorting system that receives mail in trays and sorts mail to trays and a dock area including a plurality of transportation docks that provide interface with transportation vehicles, a method of receiving trays of mail from transportation fixtures and dispatching trays of mail to transportation fixtures, comprising:

providing a receiving and dispatching system having at least one receiving and dispatching assembly that is operable to load trays of sorted mail from a sorting system to transportation fixtures and unload trays of mail to be sorted from transportation fixtures to the sorting system; and

substantially directly moving fixtures between transportation vehicles and said receiving and dispatching system.

11. (Amended) The method of receiving and dispatching trays in claim 10 including positioning said receiving and dispatching system at said dock area.

12. (Amended) In a postal processing facility including a sorting system that receives mail in trays and sorts mail to trays, a method of receiving trays of mail from transportation fixtures and dispatching trays of mail to transportation fixtures, comprising:

providing a receiving and dispatching system adapted to load and unload transportation fixtures;

loading trays of sorted mail from a sorting system to transportation fixtures and unloading trays of mail to be sorted from transportation fixtures to the sorting machine; and

wherein said loading and unloading include commonly loading and unloading with a common receiving and dispatching assembly.

13. (Amended) The method of receiving and dispatching in claim 12 including providing a receiving

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and dispatching system having a transport mechanism adapted to load trays of mail to transportation fixtures and unload trays of mail from the transportation fixtures.

14. (Amended) The method of receiving and dispatching in claim 13 including providing a plurality of said transport mechanisms.

15. (Amended) The method of receiving and dispatching in claim 14 including loading trays of mail to transportation fixtures with ones of said transport mechanism and unloading trays of mail from the transportation fixtures with others of said transport mechanisms.

16. (Amended) The method of receiving and dispatching in claim 14 including loading trays of mail to transportation fixtures and unloading trays of mail from transportation fixtures with substantially all of said transport mechanisms.

Please insert new claims 17-24 as follows:

17. A postal processing facility including a sorting system that receives mail in trays and sorts mail to trays and a dock area including at least one transportation dock that provides interface with at least one transportation vehicle, said postal processing facility comprising:

a receiving and dispatching system that is operable to load trays of sorted mail from a sorting system to transportation fixtures and to unload trays of mail to be sorted from transportation fixtures to the sorting system; and

wherein said receiving and dispatching system provides substantially direct movement of fixtures between transportation vehicles and said receiving and dispatching system.

18. The postal processing facility of claim 17, wherein said receiving and dispatching system includes at least one receiving and dispatching assembly that is adapted to both unload transportation fixtures and load transportation fixtures.

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19. The postal processing facility of claim 18 including a plurality of said receiving and dispatching assemblies, a sortation conveyor having a main line defined by a conveying surface and a plurality of spurs, extending from said main line to said receiving and dispatching assemblies.

20. The postal processing facility of claim 19, wherein said spurs include separate spur lines for moving trays from said sortation conveyor to the receiving and dispatching assemblies and for moving trays from said receiving and dispatching assemblies to said sortation conveyor.

21. The postal processing facility of claim 19, wherein said conveying surface is a continuous loop.

22. The postal processing facility of claim 19, wherein said conveying surface is elevated with respect to said receiving and dispatching assemblies.

23. The postal processing facility of claim 19 including individual enclosures around said receiving and dispatching assemblies with a movable gate that can be selectively opened to allow other transportation fixtures in other receiving and dispatching assemblies to be loaded or unloaded while one transportation fixture is being removed.

24. The postal processing facility of claim 17, wherein said transportation fixtures are wheeled carts.

REMARKS

Entry of the amendment prior to calculation of the filing fee is requested. The amendment herein is fully supported by the application as filed. Accordingly, no new matter is added.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

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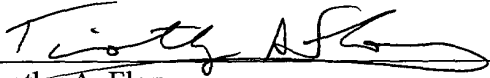
An early and favorable action on the merits is earnestly requested.

Respectfully submitted,

GARY P. BURNS et al.

By: Van Dyke, Gardner, Linn & Burkhardt, LLP

Dated: October 30, 2001.


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RAP04 P-582A

PATENT
RAP04 P-582A
Express Mail No. EL686018325US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

International Application No. : PCT/EP00/04283
International Filing Date : May 10, 2000
Applicants : Gary P. Burns and Matthew R. Dubois
For : DOCK-TO-DOCK RECEIVING AND
DISPENSING FOR POSTAL PROCESSING CENTER

Box PCT
Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 1-16 have been amended as follows:

1. (Amended) A postal processing facility including a sorting system that receives mail in trays and sorts mail to trays and a dock area including a plurality of transportation docks that provide interface with transportation vehicles, comprising:

a receiving and dispatching system (34)-having at least one receiving and dispatching assembly (44)-that loads trays of sorted mail from a sorting system to transportation fixtures and unloads trays of mail to be sorted from transportation fixtures to the sorting system; and

wherein said receiving and dispatching system (34)-is at the dock area of the postal processing facility thereby providing substantially direct movement of fixtures between transportation vehicles (26)-and said receiving and dispatching system-(34).

2. (Amended) The postal processing facility of claim 1 wherein said receiving and dispatching system (34)-includes at least one receiving and dispatching assembly (44)-that is adapted to both unload transportation fixtures and load transportation fixtures.

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3. (Amended) The postal processing facility of claim 2 including a plurality of said receiving and dispatching assemblies ~~(34)~~, a sortation conveyor ~~(38)~~ having a main line ~~(40)~~ defined by a conveying surface and a plurality of spurs ~~(42)~~, extending from said ~~mail~~ main line ~~(40)~~ to said receiving and dispatching assemblies ~~(44)~~.

4. (Amended) The postal processing facility of claim 3 wherein said spurs ~~(42)~~ include separate spur lines for moving trays from said sortation conveyor ~~(38)~~ to the receiving and dispatching assemblies ~~(44)~~ and for moving trays from said receiving and dispatching assemblies ~~(44)~~ to said sortation conveyor ~~(38)~~.

5. (Amended) The postal processing facility of claim 3 wherein said conveying surface is a continuous loop ~~(Fig.5)~~.

6. (Amended) The postal processing facility of claim 3 wherein said conveying surface is elevated with respect to said receiving and dispatching assemblies ~~(44)~~.

7. (Amended) The postal processing facility of claim 3 including individual enclosures around said receiving and dispatching assemblies ~~(44)~~ with a moveable gate ~~(56)~~ that can be selectively opened to allow other transportation fixtures in other receiving and dispatching assemblies ~~(44)~~ to be loaded or unloaded while one transportation fixture is being removed.

8. (Amended) The postal processing facility of claim 1 wherein said transportation fixtures are wheeled carts.

9. (Amended) A postal processing facility including a sorting system that receives mail in trays and sorts mail to trays, comprising:

a receiving and dispatching system ~~(34)~~ that loads trays of sorted mail from a sorting system to transportation fixtures and unloads trays of mail to be sorted from transportation fixtures to the sorting system; and

wherein said receiving and dispatching system ~~(34)~~ includes at least one receiving and

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dispatching assembly (44)-that is adapted to both unload transportation fixtures and load transportation fixtures.

10. (Amended) In a postal processing facility (20)-including a sorting system that receives mail in trays and sorts mail to trays and a dock area including a plurality of transportation docks that provide interface with transportation vehicles-(26)-, a method of receiving trays of mail from transportation fixtures and dispatching trays of mail to transportation fixtures, comprising:

providing a receiving and dispatching system (34)-having at least one receiving and dispatching assembly (44)-that is operable to load trays of sorted mail from a sorting system to transportation fixtures and unload trays of mail to be sorted from transportation fixtures to the sorting system; and

substantially directly moving fixtures between transportation vehicles (26)-and said receiving and dispatching system-(34).

11. (Amended) The method of receiving and dispatching trays in claim 10 including positioning said receiving and dispatching system (34)-at said dock area.

12. (Amended) In a postal processing facility including a sorting system that receives mail in trays and sorts mail to trays, a method of receiving trays of mail from transportation fixtures and dispatching trays of mail to transportation fixtures, comprising:

providing a receiving and dispatching system (34)-adapted to load and unload transportation fixtures;

loading trays of sorted mail from a sorting system (34)-to transportation fixtures and unloading trays of mail to be sorted from transportation fixtures to the sorting machine-(32); and

wherein said loading and unloading include commonly loading and unloading with a common receiving and dispatching assembly-(44).

13. (Amended) The method of receiving and dispatching in claim 12 including providing a receiving and dispatching system (34)-having a transport mechanism (50)-adapted to load trays of mail to transportation fixtures and unload trays of mail from the transportation fixtures.

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14. (Amended) The method of receiving and dispatching in claim 13 including providing a plurality of said transport mechanisms ~~(50)~~.

15. (Amended) The method of receiving and dispatching in claim 14 including loading trays of mail to transportation fixtures with ones of said transport mechanism ~~(50)~~ and unloading trays of mail from the transportation fixtures with others of said transport mechanisms ~~(50)~~.

16. (Amended) The method of receiving and dispatching in claim 14 including loading trays of mail to transportation fixtures and unloading trays of mail from transportation fixtures with substantially all of said transport mechanisms ~~(50)~~.

10/PRTS

JCO5 Rec'd PCT/PTO

10/018268

30 OCT 2001

WO 00/67922

PCT/EP00/04283

5 DOCK-TO-DOCK RECEIVING AND DISPENSING FOR POSTAL PROCESSING
CENTER

BACKGROUND OF THE INVENTION

10 The present invention is directed to a postal processing facility such as the type which processes letter mail, flat mail, such as magazines, and the like, such as by sorting mail by zip code or some other convenient index. More particularly, the invention relates to the dispatching of trays of sorted mail from a sorting system to transportation fixtures and the unloading of trays of mail to be sorted from transportation fixtures to
15 the sorting system.

A conventional integrated processing facility 10, such as shown in figure 1, includes an unloading system 12, which unloads trays, each of which contains incoming letters, flat mail, or the like, from transportation fixtures, such as ERMCS rolling carts, or pallets,
20 or the like, and inducts the containers to a Tray Management System (TMS) which feeds the trays to the remaining portion of the mail-sorting system generally illustrated at 14. Integrated processing facility 10 additionally includes a loading system 16 which receives trays of letters, flat mail, and the like, from mail-sorting system 14 via the TMS and loads the letter trays to the transportation fixtures; namely, carts, pallets, or the
25 like. In the illustrated embodiment, loading system 16 may be of the general type disclosed in figure 1 of commonly assigned Patent Cooperation Treaty (PCT) patent application Serial No. PCT/EP99/00317 filed January 21, 1999, the disclosure of which is hereby incorporated herein by reference. Unloading system 12 may be of the type illustrated in figure 2 of said PCT patent application.

30 As can be seen by reference to figure 1, loading system 16 and unloading system 12 are positioned in an interior portion of integrated processing facility 10. The transportation fixtures are received from vehicles, such as semitrailer trucks, at a

loading dock (not shown) which is, by necessity, positioned at a peripheral portion of facility 10. Because the loading dock is at a peripheral portion of facility 10 and loading system 16, and unloading system 12 is at an interior portion of facility 10, it is necessary to transport the transportation fixtures a significant distance between the loading system 16, unloading system 12, and the loading dock. This has traditionally been carried out by manual movement of the carts and forklift transportation of pallets. Recently, it has been suggested to use Automatic-Guided Vehicles (AGVs) to move the transportation fixtures between the loading dock, loading system 16 and unloading system 12. This transportation creates additional processing time and capital expenditures, thereby adding to the cost of mail processing. Furthermore, such prior art processing facility is inefficient in equipment utilization. Trucks with incoming mail would be positioned at a dock space relatively close to unloading system 12 in order to deliver incoming trays and then be repositioned at another dock space closer to loading system 16 in order to receive outgoing mail. Furthermore, unloading system 12 is utilized during a relatively short period of time as illustrated by the portion designated "RCS Dispatch Only" in figure 11. Likewise, loading system 16 is utilized only during a relatively small portion of the schedule indicated by "outgoing mail volume" in figure 11. Accordingly, equipment utilization both within facility 10 and adjunct to facility 10 is relatively low.

SUMMARY OF THE INVENTION

The present invention provides a postal processing facility receiving and dispatch system that eliminates the necessity for unloading to and dispatching from internal portions of the facility. The present invention furthermore combines the use of equipment in a manner that utilizes the equipment throughout the processing day. The present invention also eliminates the necessity for dedicated input doors and output doors at the loading dock. Therefore, trucks do not need to be moved between input doors and output doors, thereby simplifying the handling of trucks in the yard.

These and other objects, advantages, and features of this invention will become apparent upon review of the following specification in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

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Fig. 1 is a top plan view of an integrated processing facility provided by the prior art;
Fig. 2 is a top plan view of an integrated processing facility according to the invention;
Fig. 3 is an enlarged portion of the area indicated by III in Fig. 2;
Figs. 4a and 4b are illustrations of a process for loading and unloading trays of mail
10 between a vehicle and a sorting system according to the invention;
Fig. 5 is a top plan view of the area indicated by V in Fig. 3;
Fig. 6 is a side elevation of the view indicated by VI-VI in Fig. 5;
Fig. 7 is a sectional view taken along the lines VII-VII in Fig. 5;
Fig. 8 is a side elevation of the lifter mechanism in Fig. 7;
15 Fig. 9 is a sectional view taken along the lines IX-IX in Fig. 5;
Fig. 10 is a perspective view of the robot in Fig. 9; and
Fig. 11 is a diagram illustrating daily mail volume in an integrated processing facility.

DESCRIPTION OF THE PREFERRED EMBODIMENT

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Referring now specifically to the drawings, and the illustrative embodiments depicted therein, a postal processing system 20 includes a building 22 having a loading dock 24 which, as is traditional, includes a plurality of loading doors and another traditional dock facility (not shown) to accommodate vehicles 26 which, in the illustrated
25 embodiment, are semitrailer trucks. Alternatively, vehicles 26 could be train cars, vans, or the like. As is conventional, postal processing facility 20 includes a mail-sorting system 28, including a Tray Management System (TMS) 30, which conveys and sorts trays between a series of mail-sorting machines, generally shown at 32.

30

Postal processing facility 20 additionally includes a receiving and dispatching system 34 that loads trays of sorted mail from TMS 30 to transportation fixtures, such as ERMCS carts, pallets, or the like, and unloads trays of mail to be sorted from

transportation fixtures to TMS 30. Receiving and dispatching system 34 is made up of a plurality of receiving and dispatching cells 36, each of which is interconnected with a sortation conveyor 38, as will be described in more detail below. Each receiving and dispensing cell 36 is capable of loading trays of sorted mail to transportation fixtures and unloading trays of mail from transportation fixtures. This eliminates the necessity for separate loading systems and unloading systems which, as previously set forth, are poorly utilized throughout the processing day. Advantageously, receiving and dispensing cells 36 are at loading dock 24. This eliminates the necessity for a transportation system to transport the transportation fixtures between the loading dock and an interior portion of the processing facility. Furthermore, each vehicle 26 may remain positioned at a single loading/unloading door with transportation fixtures removed from the vehicle, the trays of sorted mail removed from the transportation fixtures, the trays of sorted mail loaded to transportation fixtures, and the transportation fixtures loaded to the vehicle 26 without having to move the vehicle 26 between an unloading door and a separate loading door.

Receiving and dispatching cell 36 includes a sortation conveyor 38 having a main line 40 which, preferably, is a recirculating continuous loop (Fig. 5). A plurality of spurs 42 extend from main line 40 to a receiving and dispatching assembly 44. Sortation conveyor 38 is elevated with respect to each receiving and dispatching assembly 44 wherein trays are lowered from sortation conveyor 38 by a mechanism, such as a gravity chute 46 (Fig. 6).

Each receiving end dispatching assembly 44 includes a plurality of cart positioners 48 and a transport mechanism 50 for transporting mail trays between spur 42 and each cart positioner 48. Spur 42 includes a powered roller conveyor 52 which extends the length of receiving and dispatching assembly 44. In the illustrated embodiment, transportation mechanism 50 is a robot of the type manufactured by Fanuc products under Model M710i. It should be understood that transport mechanism 50 could alternatively be of the type disclosed in PCT patent application Serial No. PCT/EP99/00317 filed January 21, 1999, for a HIGH THROUGHPUT DISPATCH SYSTEM FOR MAIL PROCESSING AND DISTRIBUTION SYSTEM, the disclosure of

which is hereby incorporated herein by reference, suitably modified to be capable of unloading carts as well as loading carts. Preferably, receiving and dispatching assembly 44 is enclosed with an enclosure 54, such as a fence, in order to keep personnel from the operation of transport mechanism 50. Enclosure 54 includes a
5 moveable gate 56 at each cart positioner 48 which can be selectively opened to allow transportation fixtures to be loaded or unloaded to the receiving and dispatching assembly 44. Advantageously, this arrangement allows receiving and dispatching system 34 to continue to operate even though a particular receiving and dispatching cell is having a cart replaced because only one cell is locked out at a time.

10 Powered roller conveyor 52 includes a lift mechanism 58 at strategic locations along the powered roller conveyor. Lift mechanism 58 (Fig. 7) includes a plurality of support fingers 60 which are selectively elevated by a lift assembly 62 when a tray is positioned
15 over the lift mechanism. A pair of positioning arms 64 serve to center the tray over the lift mechanism. When lift mechanism 58 is actuated, the tray is elevated in order to allow transport mechanism 50 to engage the tray from either a lateral side direction or an end longitudinal direction. This allows the transport mechanism to position each tray
20 73 328 on a cart in either of two orthogonally related positions. This allows trays to be staggered on the cart in alternating patterns in order to increase security of cart loading. Receiving and dispatching assembly 44 additionally includes a half tray support 66 adjacent cart positioner 48. This provides a staging area for transport
25 mechanism 50 to position half trays during the loading of a cart. If transport mechanism 50 comes across another half tray, then the two half trays can be positioned together in order to provide the same profile as a full tray. This avoids any instability caused by the placement of a half tray on a cart.

In the illustrative embodiment, transport mechanism 50 includes a robot arm 70 which terminates in an end-effector, or an end-of-arm tool, 72. Transport mechanism 50
30 additionally includes a transporter 82 having legs which span powered roller conveyor 52 and any mail tray on the powered roller conveyor 52. End-effector 72 includes a tray support in the form of a series of tines 74 and a clamp member 76 for clamping a tray against the tray support 74. Endeffector 72 additionally includes a pusher/grabber

mechanism 78 which pushes trays from tray support 74 concurrently with end effector 72 being withdrawn from the cart. Alternatively, pusher/grabber 78 engages a hand opening (not shown) in the side of a tray in order to pull a tray onto tray support 74. In order to facilitate the loading and unloading of trays onto tray support 74, one or more, preferably two or more, sensors, such as imaging sensors 80, are positioned on the end of tray support 74.

Receiving and dispensing system 34 operates as follows. In order to load trays of sorted mail to transportation fixtures, trays are diverted onto spur 42 by a diverter, such as a conventional pop-up rotating-belt diverter or the like, and travel down chute 46 under gravity. The tray is transported by powered roller conveyor 52 to an appropriate position for transporting by transport mechanism 50. This is accomplished by lift mechanism 58 elevating the tray and end-effector 72 of transport mechanism 50 engaging the tray from the appropriate direction according to the need of the cart being loaded. The tray is grasped between clamp mechanism 76 and tray support 74 and is positioned on the appropriate cart. This may be accomplished by transporter 82 traveling in the direction of conveyor 52. As previously set forth, trays are loaded onto carts utilizing pusher/grabber 78 to strip the tray from tray support 74. When a cart is full, the associated gate 56 is opened which shuts down the respective cell 36 while that cart is loaded onto a vehicle 26 located at an adjacent door. The cart is replaced with an empty cart and gate 56 is closed allowing the respective cell to resume operation.

In a mode in which trays are unloaded from transportation fixtures, the full fixture is positioned on a cart positioner 48 and gate 56 is closed. Transport mechanism 50 causes endeffector 72 to individually engage the trays on the cart to be unloaded. Pusher/grabber 78 is extended under the guidance of imaging sensors 80 into engagement with an opening in the side of the tray. The pusher/grabber 78 is retracted pulling the tray onto tray support 74. Clamp member 76 clamps the tray against tray support 74. Transport mechanism 50 places the cart on lift mechanism 58 in the proper orientation. Lift mechanism 58 retracts causing the tray to be properly positioned on powered roller conveyor 52. Powered roller conveyor 52 includes a powered incline

portion 52a which conveys the unloaded tray onto TMS 30 by conveying the tray uphill onto a receiving portion of sortation conveyor 38. Alternatively, it would be possible to have chute 46 replaced with a powered roller conveyor that is capable of operation in both directions such that trays being unloaded are transported upwardly away from the respective receiving and dispatching assembly. The rollers are reversed and the conveyor transported in the opposite direction to receive trays for loading onto the carts.

As can be seen by references to figures 4a and 4b, the invention can be utilized in different ways to dispatch and receive trays. Figure 4a shows three receiving and displaying cells 36 designated 1, 2, and 3. In this example, cell 1 is full of carts received from a vehicle, cell 2 is full of empty carts and cell 3 is full of carts ready for dispatch. As the carts are unloaded in cell 3, they are available for use in cell 2 which then becomes a receiving cell. As full receiving carts are removed from cell 1, they can then become a dispatch cell and replaced with full carts for dispatching. Figure 4b shows an alternative method in which individual positions within each of the cells 1, 2, and 3 are utilized as either receiving positions, dispatch positions, or empty positions. Because of the capability of the computer system (not shown) controlling the receiving and dispatching system, the function of each cart position can be determined and monitored.

As can be seen in figure 11, the present invention provides a receiving and dispatching system which is more fully utilized throughout the processing day thereby ensuring a more effective return on investment. During period A, mail is received from the trucks and processed by mail-sorting system 28. During period B, the processed mail is dispatched utilizing receiving and dispatching system 34. During period C, mail which arrives occasionally on vehicles 26 can be received as it arrives. Any remaining mail is dispatched at D.

Claims

1. A postal processing facility including a sorting system that receives mail in trays and sorts mail to trays and a dock area including a plurality of transportation docks that provide interface with transportation vehicles, comprising:
5 a receiving and dispatching system that loads trays of sorted mail from a sorting system to transportation fixtures and unloads trays of mail to be sorted from transportation fixtures to the sorting system; and wherein said receiving and dispatching system is at the dock area of the postal processing facility thereby providing substantially direct movement of fixtures between transportation
10 vehicles and said receiving and dispatching system.
2. The postal processing facility of claim 1 wherein said receiving and dispatching system includes at least one receiving and dispatching assembly that is adapted to both unload transportation fixtures and load transportation fixtures.
- 15 3. The postal processing facility of claim 2 including a plurality of said receiving and dispatching assemblies, a sortation conveyor having a main line defined by a conveying surface and a plurality of spurs, extending from said mail line to said receiving and dispatching assemblies.
- 20 4. The postal processing facility of claim 3 wherein said spurs include separate spur lines for moving trays from said sortation conveyor to the receiving and dispatching assemblies and for moving trays from said receiving and dispatching assemblies to said sortation conveyor.
- 25 5. The postal processing facility of claim 3 wherein said conveying surface is a continuous loop.
6. The postal processing facility of claim 3 wherein said conveying surface is
30 elevated with respect to said receiving and dispatching assemblies.
7. The postal processing facility of claim 3 including individual enclosures around said receiving and dispatching assemblies with a moveable gate that can be

Claim Amendments in response to the Written Opinion dated February 12, 2001

1. A postal processing facility including a sorting system that receives mail in trays and sorts mail to trays and a dock area including a plurality of transportation docks that provide interface with transportation vehicles, comprising:

a receiving and dispatching system (34) having at least one receiving and dispatching assembly (44) that loads trays of sorted mail from a sorting system to transportation fixtures and unloads trays of mail to be sorted from transportation fixtures to the sorting system; and

wherein said receiving and dispatching system (34) is at the dock area of the postal processing facility thereby providing substantially direct movement of fixtures between transportation vehicles (26) and said receiving and dispatching system (34).

2. The postal processing facility of claim 1 wherein said receiving and dispatching system (34) includes at least one receiving and dispatching assembly (44) that is adapted to both unload transportation fixtures and load transportation fixtures.

3. The postal processing facility of claim 2 including a plurality of said receiving and dispatching assemblies (34), a sortation conveyor (38) having a main line (40) defined by a conveying surface and a plurality of spurs (42), extending from said main line (40) to said receiving and dispatching assemblies (44).

4. The postal processing facility of claim 3 wherein said spurs (42) include separate spur lines for moving trays from said sortation conveyor (38) to the receiving and dispatching assemblies (44) and for moving trays from said receiving and dispatching assemblies (44) to said sortation conveyor (38).

5. The postal processing facility of claim 3 wherein said conveying surface is a continuous loop (Fig.5).

6. The postal processing facility of claim 3 wherein said conveying surface is elevated with respect to said receiving and dispatching assemblies (44).

7. The postal processing facility of claim 3 including individual enclosures around said receiving and dispatching assemblies (44) with a moveable gate (56) that can be selectively

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AMENDED SHEET

opened to allow other transportation fixtures in other receiving and dispatching assemblies (44) to be loaded or unloaded while one transportation fixture is being removed.

8. The postal processing facility of claim 1 wherein said transportation fixtures are wheeled carts.

9. A postal processing facility including a sorting system that receives mail in trays and sorts mail to trays, comprising:

a receiving and dispatching system (34) that loads trays of sorted mail from a sorting system to transportation fixtures and unloads trays of mail to be sorted from transportation fixtures to the sorting system; and

wherein said receiving and dispatching system (34) includes at least one receiving and dispatching assembly (44) that is adapted to both unload transportation fixtures and load transportation fixtures.

10. In a postal processing facility (20) including a sorting system that receives mail in trays and sorts mail to trays and a dock area including a plurality of transportation docks that provide interface with transportation vehicles (26), a method of receiving trays of mail from transportation fixtures and dispatching trays of mail to transportation fixtures, comprising:

providing a receiving and dispatching system (34) having at least one receiving and dispatching assembly (44) that is operable to load trays of sorted mail from a sorting system to transportation fixtures and unload trays of mail to be sorted from transportation fixtures to the sorting system]; and

substantially directly moving fixtures between transportation vehicles (26) and said receiving and dispatching system (34).

11. The method of receiving and dispatching trays in claim 10 including positioning said receiving and dispatching system (34) at said dock area.

12. In a postal processing facility including a sorting system that receives mail in trays and sorts mail to trays, a method of receiving trays of mail from transportation fixtures and dispatching trays of mail to transportation fixtures, comprising:

providing a receiving and dispatching system (34)

loading trays of sorted mail from a sorting system (34) to transportation fixtures and unloading trays of mail to be sorted from transportation fixtures to the sorting machine (32); and

wherein said loading and unloading include commonly loading and unloading with a common receiving and dispatching assembly (44).

13. The method of receiving and dispatching in claim 12 including providing a receiving and dispatching system (34) having a transport mechanism (50) adapted to load trays of mail to transportation fixtures and unload trays of mail from the transportation fixtures.

14. The method of receiving and dispatching in claim 13 including providing a plurality of said transport mechanisms (50).

15. The method of receiving and dispatching in claim 14 including loading trays of mail to transportation fixtures with ones of said transport mechanism (50) and unloading trays of mail from the transportation fixtures with others of said transport mechanisms (50).

16. The method of receiving and dispatching in claim 14 including loading trays of mail to transportation fixtures and unloading trays of mail from transportation fixtures with substantially all of said transport mechanisms (50).

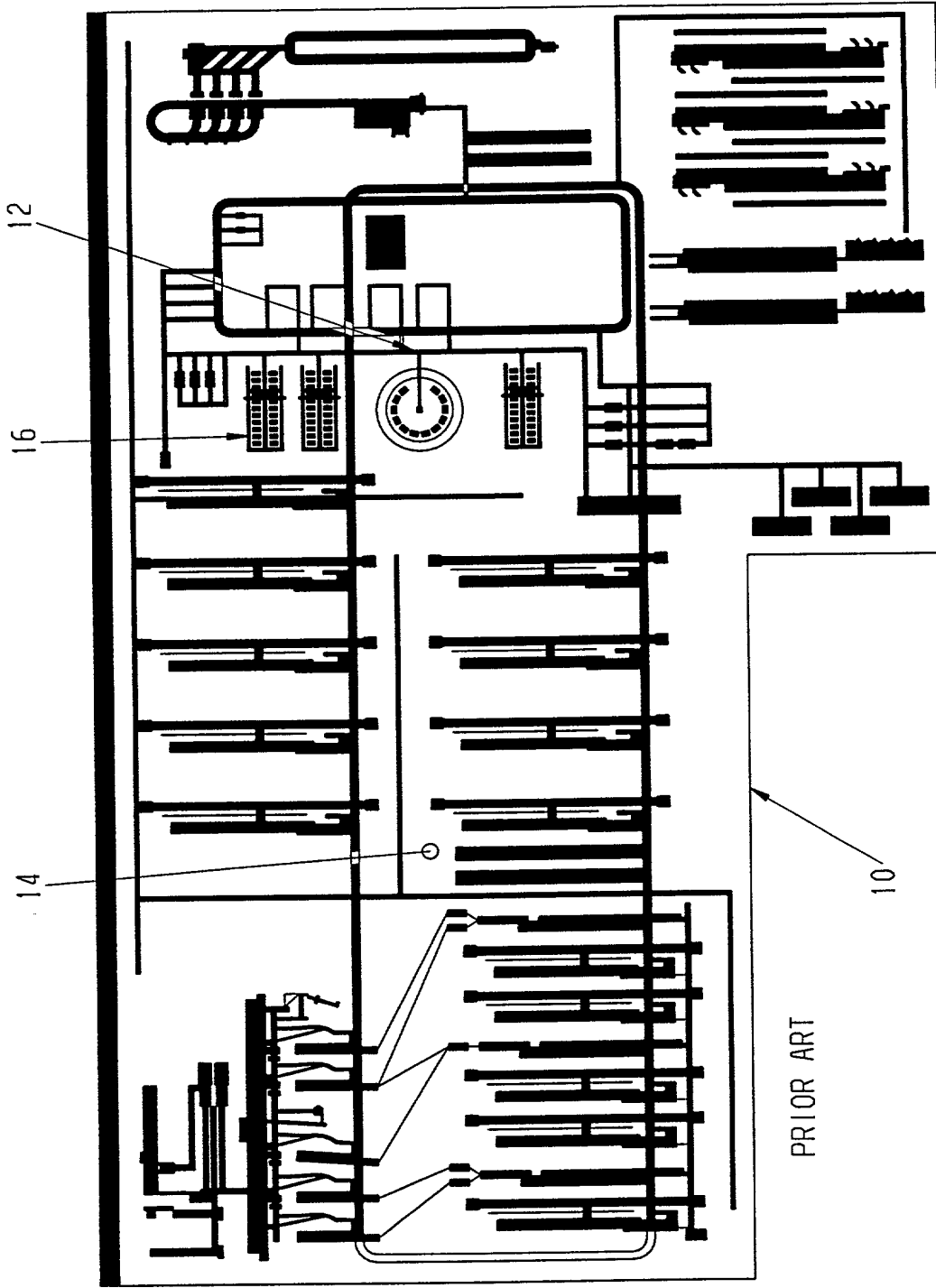


Fig. 1

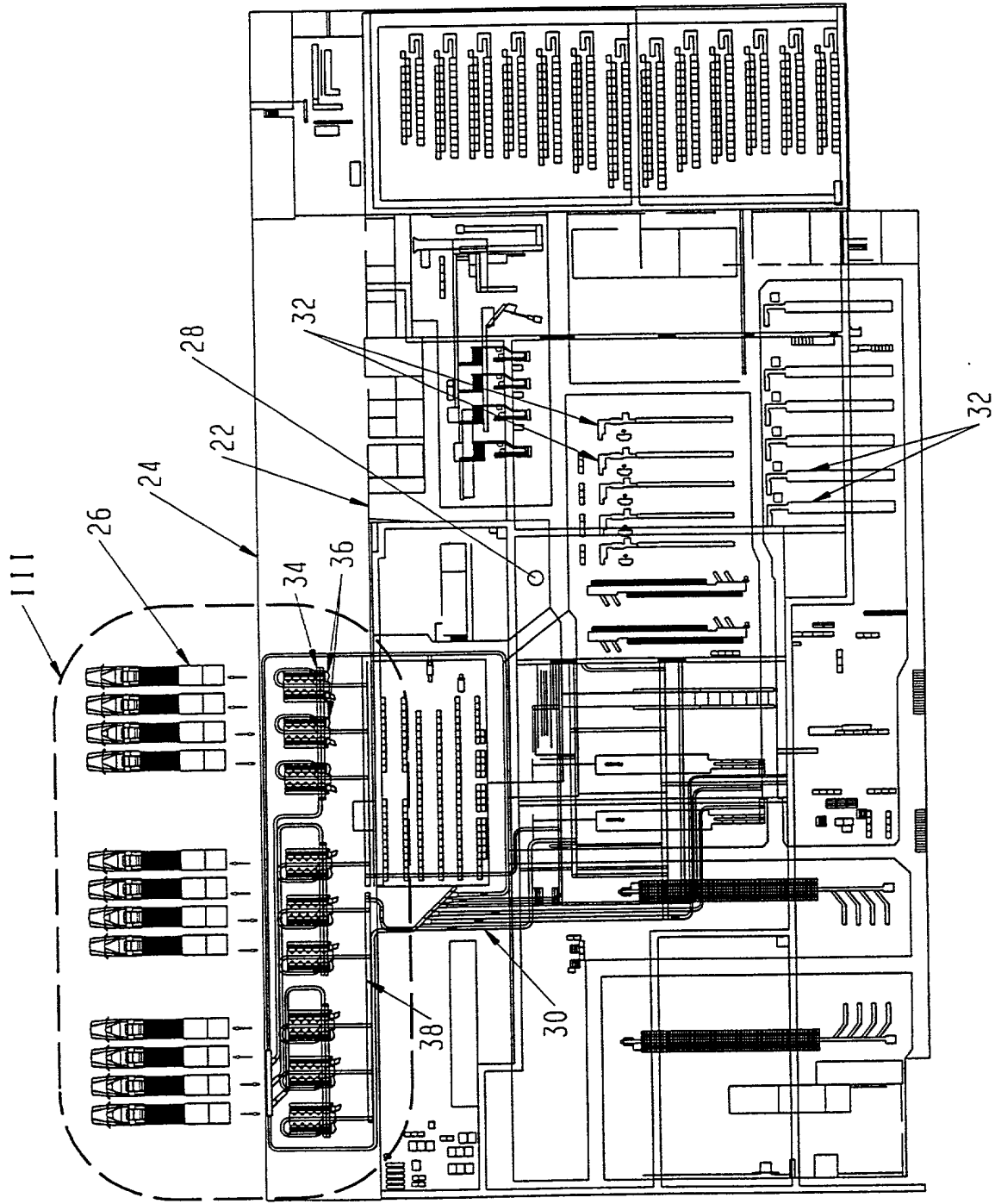


Fig. 2

Fig. 3 is a schematic diagram of a system for processing data from a plurality of sensors. The system includes a plurality of sensors (26) connected to a central processing unit (24) via a bus (30). The central processing unit (24) is connected to a memory unit (36) and a display unit (38). The system is controlled by a control unit (V).

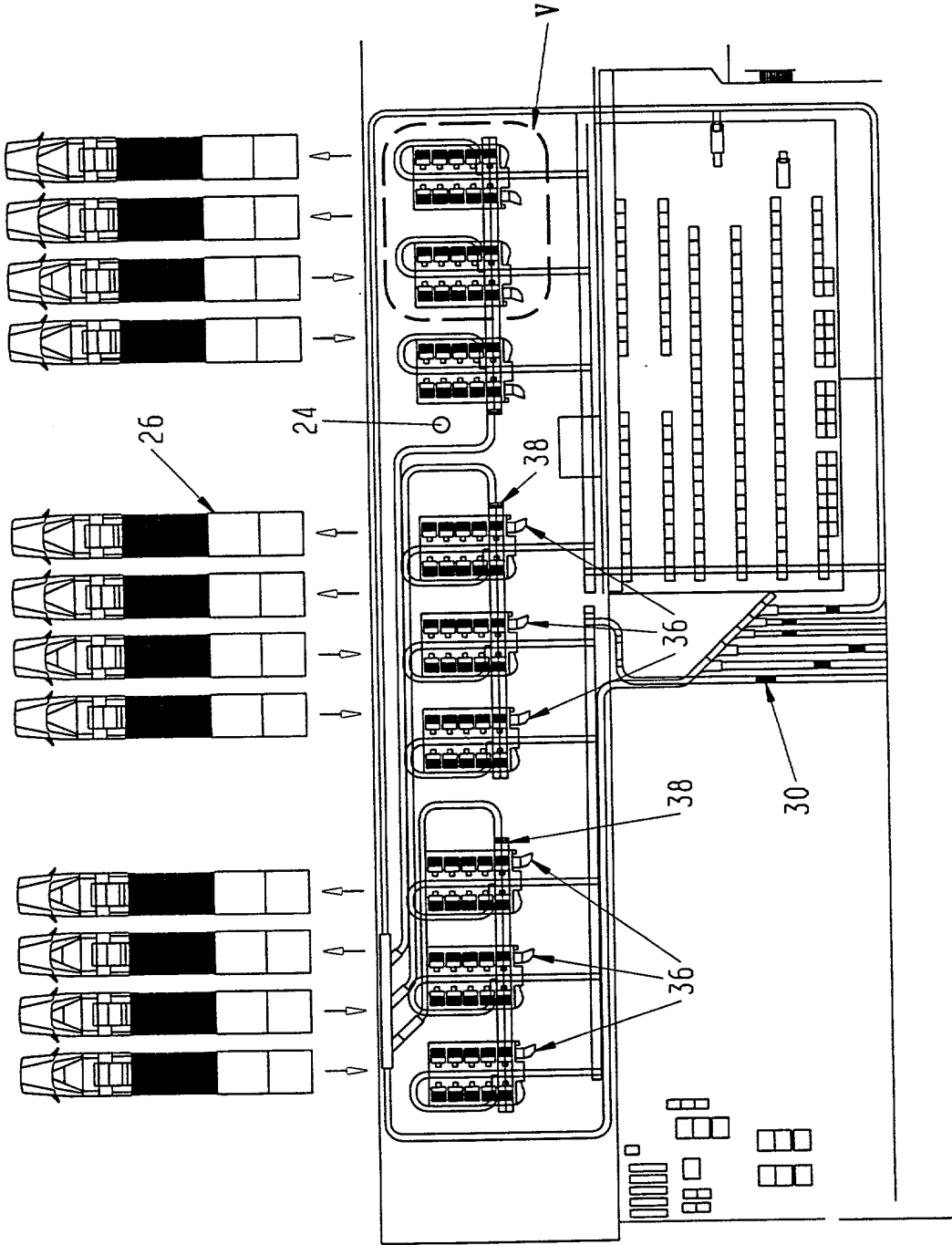


Fig. 3

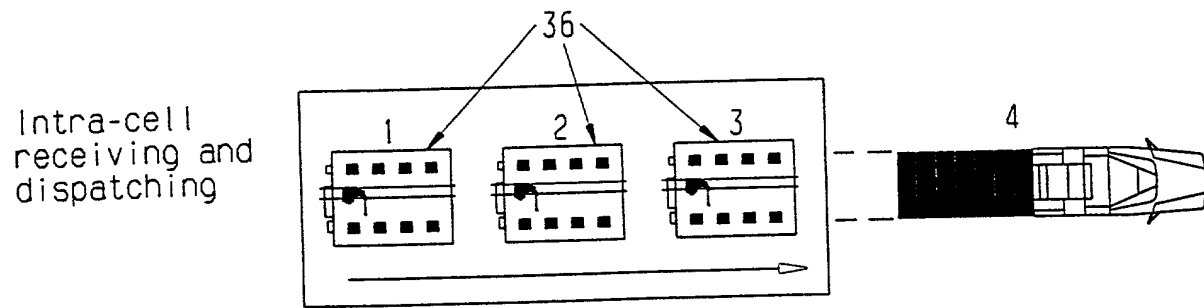


Fig. 4b

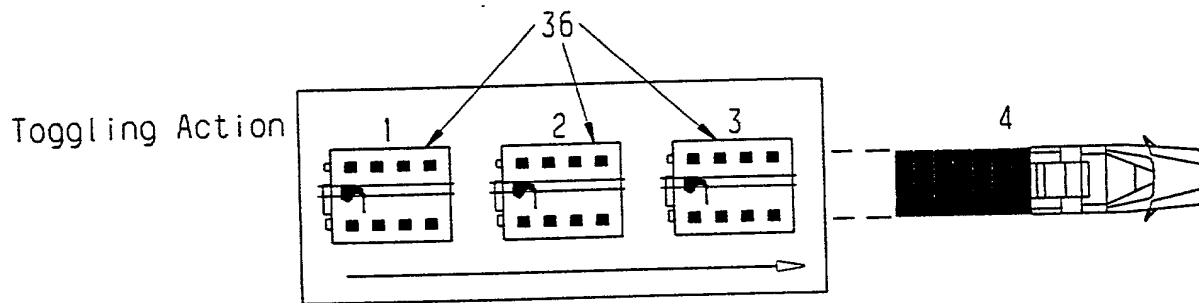


Fig. 4a

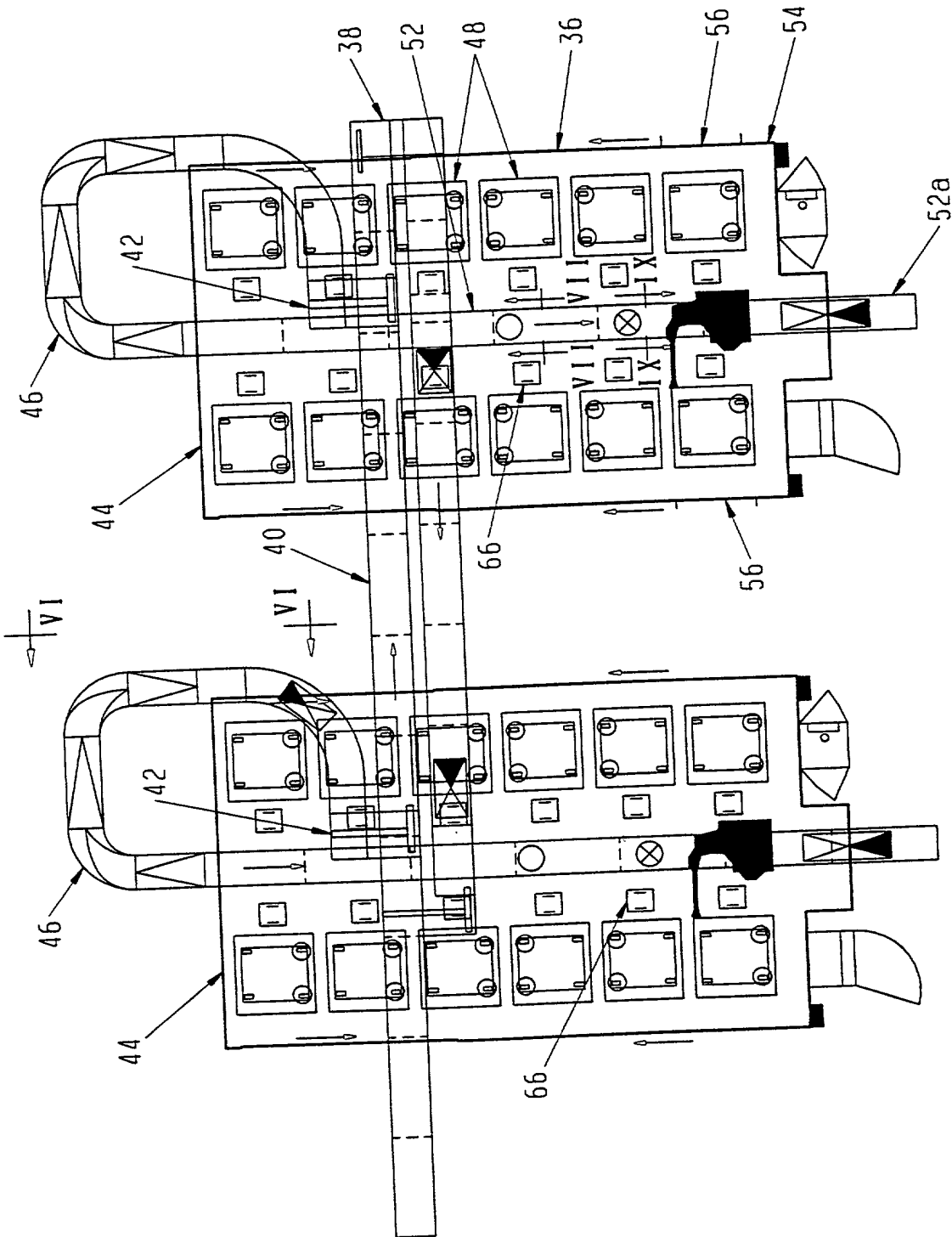


Fig. 5

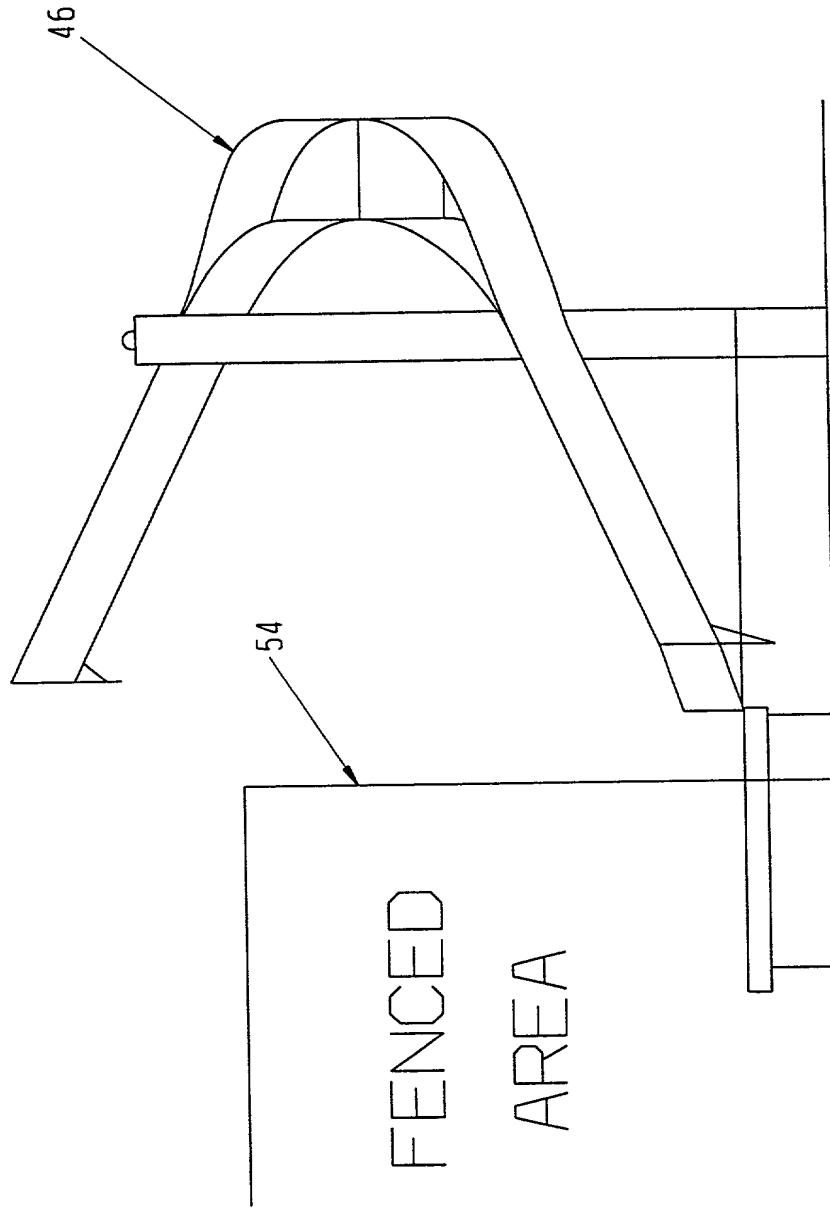


Fig. 6

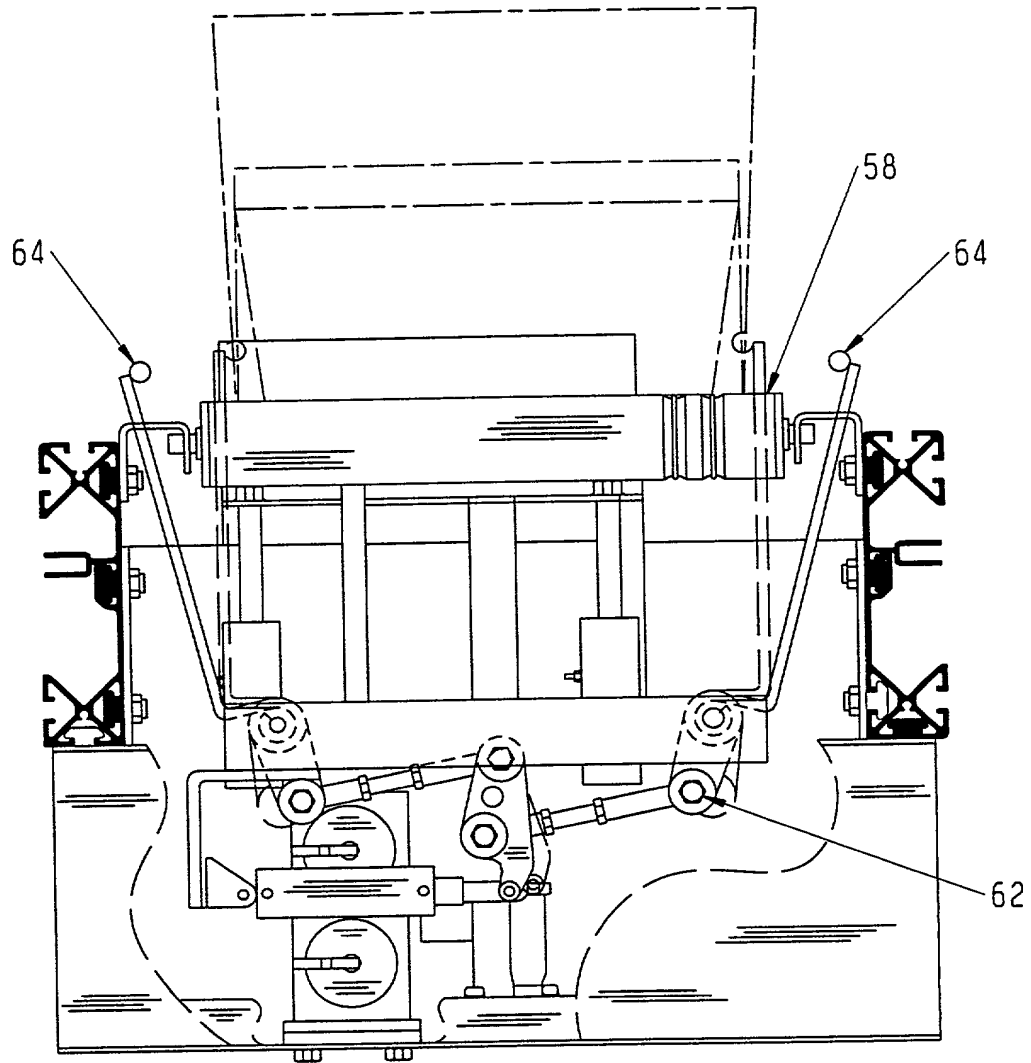


Fig. 7

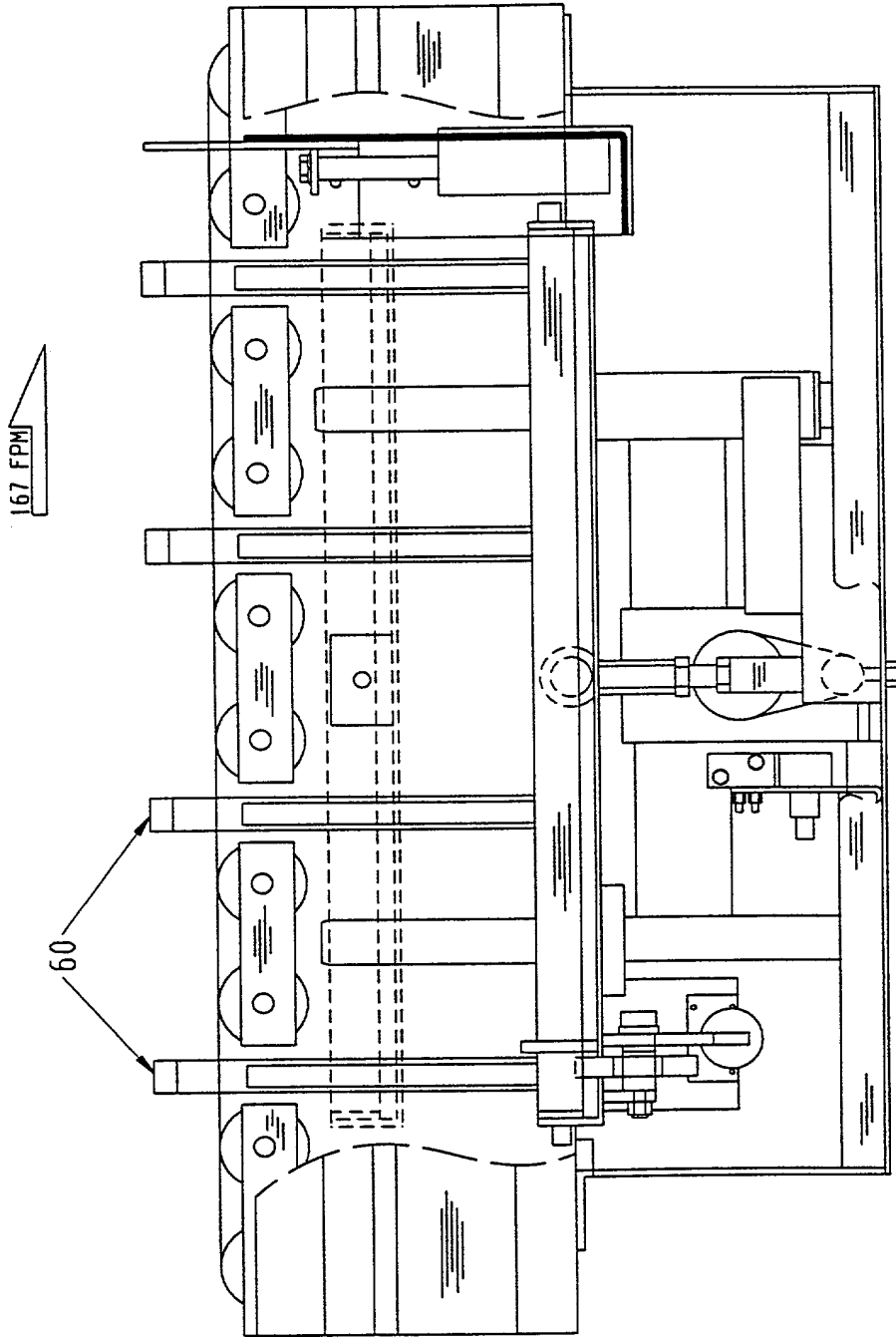


Fig. 8

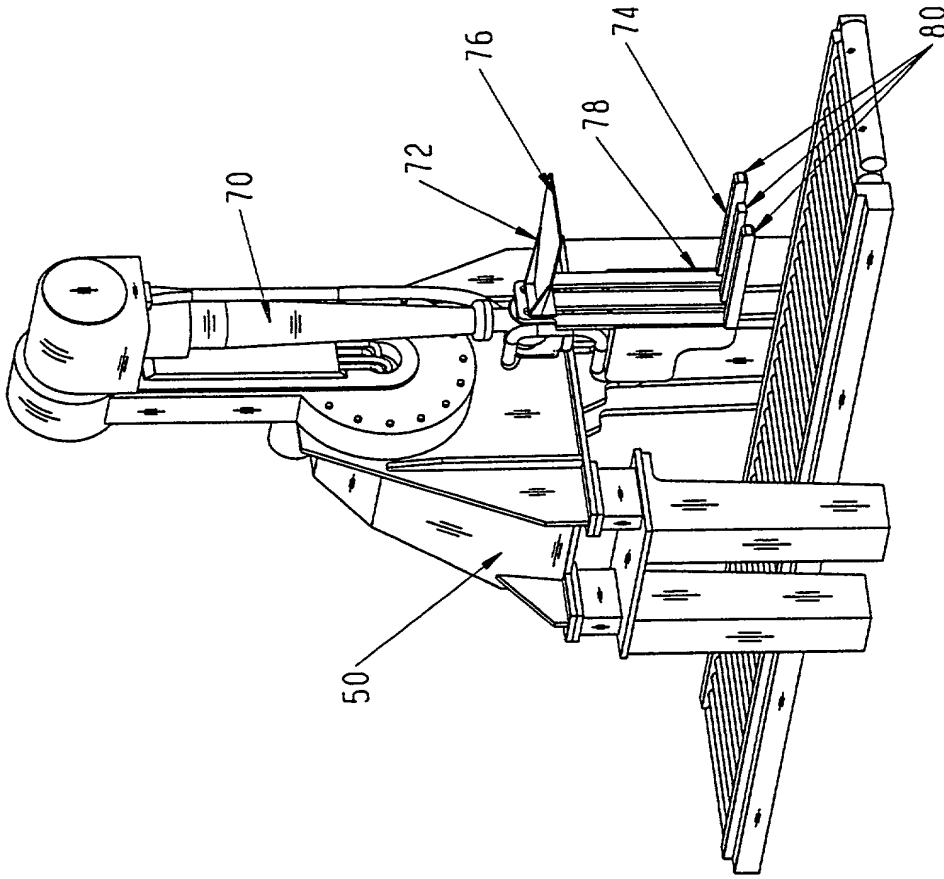


Fig. 10

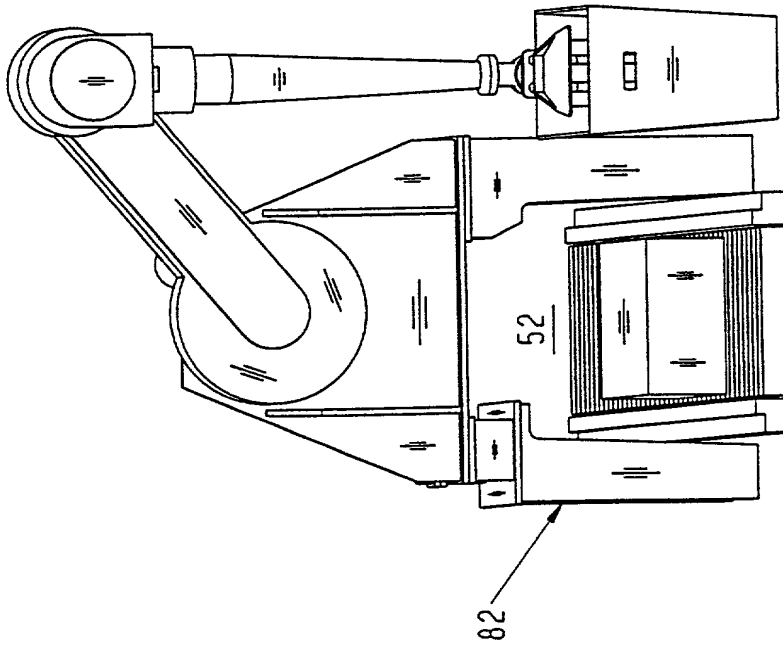


Fig. 9

Daily Mail Volumes in a Typical USPS Processing & Distribution Center

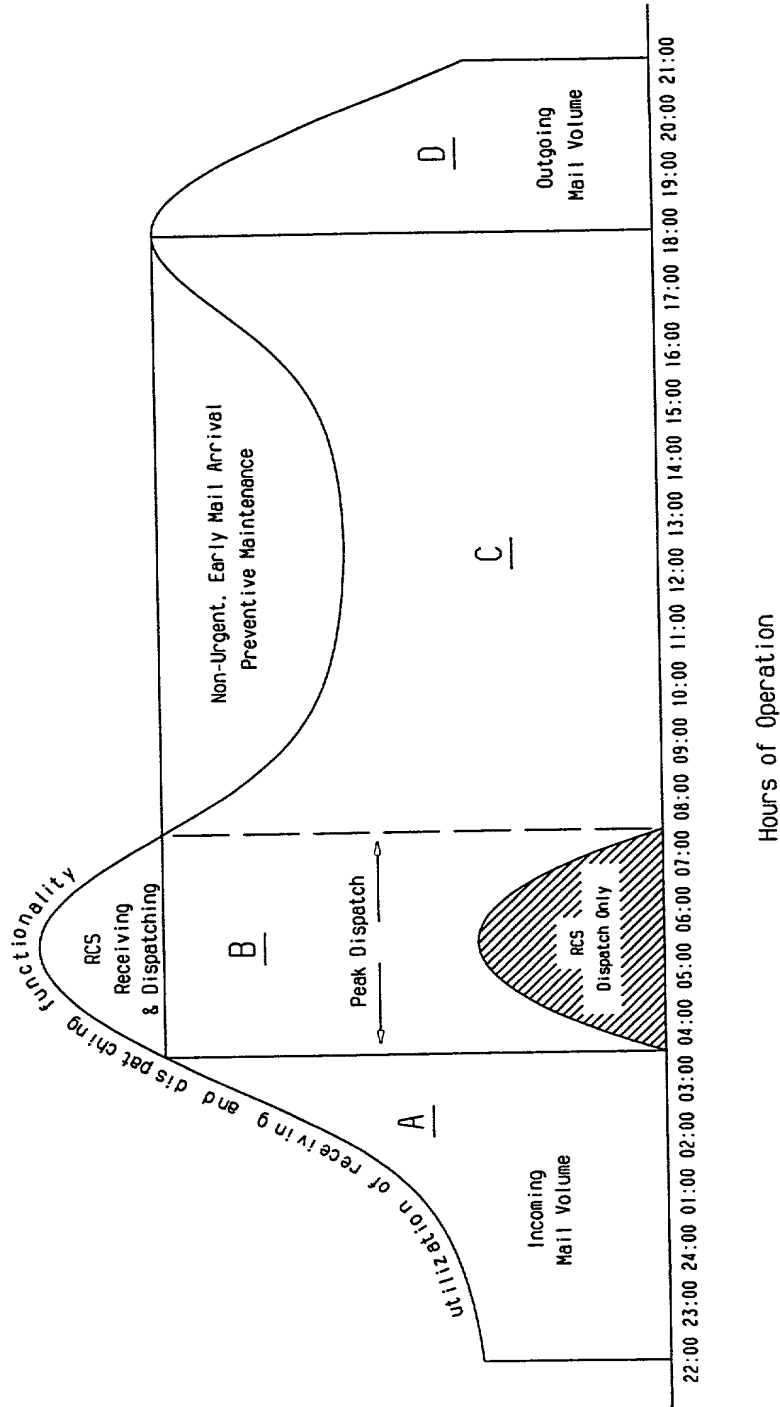


Fig. 11

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)	Attorney Docket No.	RAP04 P-582A
	First Named Inventor	Gary P. Burns
	COMPLETE IF KNOWN	
	Application No.	
	Filing Date	
	Group Art Unit	
	Examiner Name	

☒ Declaration Submitted with Initial Filing or ☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16(e)) required)

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

DOCK-TO-DOCK RECEIVING AND DISPENSING FOR POSTAL PROCESSING CENTER

(Title of the Invention)

the specification of which

☐ is attached hereto

OR

☒ was filed on (MM/DD/YY)

05/10/00

as United States Application No. or PCT International

Application No.

PCT/EP00/04283

and was amended on (MM/DD/YY)

(if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35 United States Code § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YY)	Priority Not Claimed	Certified Copy Attached? YES NO	
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			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority sheet PTO/SB/02B attached hereto:

I hereby claim benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YY)	<input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority sheet PTO/SB/02B attached hereto.
60/133,413	05/11/99	

(Page 1 of 3)

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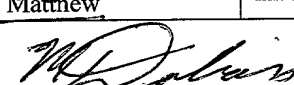
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DECLARATION

ADDITIONAL INVENTOR(S) Supplemental Sheet Page 3 of 3

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Inventor's Signature					Date		
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Post Office Address							
Post Office Address							
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DECLARATION - Utility or Design Patent Application

I hereby claim the benefit under Title 35, United States Code § 120 of any United States application(s), or § 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Patent Number	Parent Filing Date (MM/DD/YY)	Parent Patent Number (if applicable)
PCT/EP00/04283	05/10/00	

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority sheet PTO/SB/02B attached hereto.

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Donald S. Gardner	25 975	Matthew L. Goska	42 594
Terence J. Linn	30 283	Anthony A. Bisulca	40 913
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☐ Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor:		<input type="checkbox"/> A petition has been filed for this unsigned inventor.					
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Inventor's Signature					Date	1/24/01	
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City	Rockford	State	MI	Zip	49341	Country	United States

☒ Additional inventors are being named on the supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.